Columbia Hardware Overview

Category: Columbia

DRAFT

This article is being reviewed for completeness and technical accuracy.

Columbia Supercomputer

The Columbia supercluster, which ranked 2nd (51.87 Tflops/s) in the Nov 2004 Top500 list, has been in service for many years. Most of the earlier Columbia nodes (Columbia1 - Columbia20) have been retired. The remaining Columbia nodes (Columbia21-24) continue to serve the NASA community to achieve breakthroughs in science and engineering for the agency's missions and vision for Space Exploration.

Current Columbia System Facts

Manufacturer - SGI

List of nodes for Columbia system

Nodes	Type	Speed	Cache
1 Altix 4700 (512 cores)	Montecito	1.6 GHz	9MB
1 Altix 4700 (2048 cores)	Montecito	1.6 GHz	9MB
2 Altix 4700 (1024 cores)	Montvale	1.6 GHz	9MB
4 Total Compute Nodes (4,608 Total Cores)			

System Architecture

- 40 compute node cabinets
- 30 teraflop/s theoretical peak (original 10,240 system: 63 Tflop/s)

Subsystems

- 1 front-end node

Memory

- Type - double data rate synchronous dynamic random access memory (DDR SDRAM)

- Per Processor (core) - 2GB
- Total Memory - 9TB

Interconnects

- SGI® NUMAlink® interconnected single-system image compute nodes
- Internode
    - ♦ InfiniBand® - 4x (Single Data Rate, Double Data Rate)
    - ♦ 10Gb Ethernet LAN/WAN interconnect
    - ♦ 1Gb Ethernet LAN/WAN interconnect

Storage

- Online - DataDirect Networks® & LSI® RAID, 1PB (raw)
    - ♦ 1 SGI CXFS domains
    - ♦ Local SGI XFS fileystems
- Archival - Attached to high-end computing SGI CXFS SAN filesystem

Operating Environment

- Operating system - SUSE Linux Enterprise
- Job Scheduler - PBS®
- Compilers - C, Intel Fortran, SGI MPT

Article ID: 82
Last updated: 03 Aug, 2011
Computing at NAS -> Computing Hardware -> Columbia -> Columbia Hardware Overview
http://www.nas.nasa.gov/hecc/support/kb/entry/82/?ajax=1